

10/563726

IAP20 Rec'd PCT/PTO 06 JAN 2006

1/65

SEQUENCE LISTING

<110> THE GENERAL HOSPITAL CORPORATION

<120> FUGETACTIC PROTEINS, COMPOSITIONS AND METHODS OF USE

<130> (51588)62063.WO

<140> PCT/US04/021725

<141> 2004-07-07

<150> 60/485,550

<151> 2003-07-07

<160> 121

<170> PatentIn Ver. 3.3

<210> 1

<211> 724

<212> PRT

<213> Mus sp.

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Tyr	Ser	Asn	Lys	Glu	Ile	Phe	Leu	Arg	Glu	Leu	Ile	Ser	Asn	Ala	Ser
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Leu	Asp	Ser	Gly	Lys	Glu	Leu	Lys	Ile	Asp	Ile	Ile	Pro	Asn	Pro	Gln
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Glu	Arg	Thr	Leu	Thr	Leu	Val	Asp	Thr	Gly	Ile	Gly	Met	Thr	Lys	Ala
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Asp	Leu	Ile	Asn	Asn	Leu	Gly	Thr	Ile	Ala	Lys	Ser	Gly	Thr	Lys	Ala
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Phe	Met	Glu	Ala	Leu	Gln	Ala	Gly	Ala	Asp	Ile	Ser	Met	Ile	Gly	Gln
	115					120					125				

Phe	Gly	Val	Gly	Phe	Tyr	Ser	Ala	Tyr	Leu	Val	Ala	Glu	Lys	Val	Val
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Val	Ile	Thr	Lys	His	Asn	Asp	Asp	Glu	Gln	Tyr	Ala	Trp	Glu	Ser	Ser
145					150					155					160

Ala	Gly	Gly	Ser	Phe	Thr	Val	Arg	Ala	Asp	His	Gly	Glu	Pro	Ile	Gly
				165					170						175

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Arg	Gly	Thr	Lys	Val	Ile	Leu	His	Leu	Lys	Glu	Asp	Gln	Thr	Glu	Tyr	180	185	190
Leu	Glu	Glu	Arg	Arg	Val	Lys	Glu	Val	Val	Lys	Lys	His	Ser	Gln	Phe	195	200	205
Ile	Gly	Tyr	Pro	Ile	Thr	Leu	Tyr	Leu	Glu	Lys	Glu	Arg	Glu	Lys	Glu	210	215	220
Ile	Ser	Asp	Asp	Glu	Ala	Glu	Glu	Glu	Lys	Gly	Glu	Lys	Glu	Glu	Glu	225	230	235
Asp	Lys	Asp	Asp	Glu	Glu	Lys	Pro	Lys	Ile	Glu	Asp	Val	Gly	Ser	Asp	245	250	255
Glu	Glu	Asp	Asp	Ser	Gly	Lys	Asp	Lys	Lys	Lys	Lys	Thr	Lys	Lys	Ile	260	265	270
Lys	Glu	Lys	Tyr	Ile	Asp	Gln	Glu	Glu	Leu	Asn	Lys	Thr	Lys	Pro	Ile	275	280	285
Trp	Thr	Arg	Asn	Pro	Asp	Asp	Ile	Thr	Gln	Glu	Glu	Tyr	Gly	Glu	Phe	290	295	300
Tyr	Lys	Ser	Leu	Thr	Asn	Asp	Trp	Glu	Asp	His	Leu	Ala	Val	Lys	His	305	310	315
Phe	Ser	Val	Glu	Gly	Gln	Leu	Glu	Phe	Arg	Ala	Leu	Leu	Phe	Ile	Pro	325	330	335
Arg	Arg	Ala	Pro	Phe	Asp	Leu	Phe	Glu	Asn	Lys	Lys	Lys	Lys	Asn	Asn	340	345	350
Ile	Lys	Leu	Tyr	Val	Arg	Arg	Val	Phe	Ile	Met	Asp	Ser	Cys	Asp	Glu	355	360	365
Leu	Ile	Pro	Glu	Tyr	Leu	Asn	Phe	Ile	Arg	Gly	Val	Val	Asp	Ser	Glu	370	375	380
Asp	Leu	Pro	Leu	Asn	Ile	Ser	Arg	Glu	Met	Leu	Gln	Gln	Ser	Lys	Ile	385	390	395
Leu	Lys	Val	Ile	Arg	Lys	Asn	Ile	Val	Lys	Lys	Cys	Leu	Glu	Leu	Phe	405	410	415
Ser	Glu	Leu	Ala	Glu	Asp	Lys	Glu	Asn	Tyr	Lys	Lys	Phe	Tyr	Glu	Ala	420	425	430
Phe	Ser	Lys	Asn	Leu	Lys	Leu	Gly	Ile	His	Glu	Asp	Ser	Thr	Asn	Arg	435	440	445
Arg	Arg	Leu	Ser	Glu	Leu	Leu	Arg	Tyr	His	Thr	Ser	Gln	Ser	Gly	Asp	450	455	460
Glu	Met	Thr	Ser	Leu	Ser	Glu	Tyr	Val	Ser	Arg	Met	Lys	Glu	Thr	Gln	465	470	475
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Lys Ser Ile Tyr Tyr Ile Thr Gly Glu Ser Lys Glu Gln Val Ala Asn
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 Ser Ala Phe Val Glu Arg Val Arg Lys Arg Gly Phe Glu Val Val Tyr
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 Met Thr Glu Pro Ile Asp Glu Tyr Cys Val Gln Gln Leu Lys Glu Phe
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 Asp Gly Lys Ser Leu Val Ser Val Thr Lys Glu Gly Leu Glu Leu Pro
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 Glu Asp Glu Glu Glu Lys Lys Lys Met Glu Glu Ser Lys Ala Lys Phe
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 Glu Asn Leu Cys Lys Leu Met Lys Glu Ile Leu Asp Lys Lys Val Glu
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 Lys Val Thr Ile Ser Asn Arg Leu Val Ser Ser Pro Cys Cys Ile Val
 580 585 590
 Thr Ser Thr Tyr Gly Trp Thr Ala Asn Met Glu Arg Ile Met Lys Ala
 595 600 605
 Gln Ala Leu Arg Asp Asn Ser Thr Met Gly Tyr Met Met Ala Lys Lys
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 645 650 655
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 660 665 670
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 <212> PRT
 <213> Homo sapiens

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 Asp Ala Leu Asp Lys Ile Arg Tyr Glu Ser Leu Thr Asp Pro Ser Lys
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 Leu Asp Ser Gly Lys Glu Leu Lys Ile Asp Ile Ile Pro Asn Pro Gln
 65 70 75 80
 Glu Arg Thr Leu Thr Leu Val Asp Thr Gly Ile Gly Met Thr Lys Ala
 85 90 95
 Asp Leu Ile Asn Asn Leu Gly Thr Ile Ala Lys Ser Gly Thr Lys Ala
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 Phe Met Glu Ala Leu Gln Ala Gly Ala Asp Ile Ser Met Ile Gly Gln
 115 120 125
 Phe Gly Val Gly Phe Tyr Ser Ala Tyr Leu Val Ala Glu Lys Val Val
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 Val Ile Thr Lys His Asn Asp Asp Glu Gln Tyr Ala Trp Glu Ser Ser
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 Ala Gly Gly Ser Phe Thr Val Arg Ala Asp His Gly Glu Pro Ile Gly
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 Arg Gly Thr Lys Val Ile Leu His Leu Lys Glu Asp Gln Thr Glu Tyr
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 Ile Gly Tyr Pro Ile Thr Leu Tyr Leu Glu Lys Glu Arg Glu Lys Glu
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 225 230 235 240
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 Glu Glu Asp Asp Ser Gly Lys Asp Lys Lys Lys Thr Lys Lys Ile
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 Lys Glu Lys Tyr Ile Asp Gln Glu Glu Leu Asn Lys Thr Lys Pro Ile
 275 280 285
 Trp Thr Arg Asn Pro Asp Asp Ile Thr Gln Glu Glu Tyr Gly Glu Phe
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 Tyr Lys Ser Leu Thr Asn Asp Trp Glu Asp His Leu Ala Val Lys His
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Phe Ser Val Glu Gly Gln Leu Glu Phe Arg Ala Leu Leu Phe Ile Pro
 325 330 335
 Arg Arg Ala Pro Phe Asp Leu Phe Glu Asn Lys Lys Lys Lys Asn Asn
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 Ile Lys Leu Tyr Val Arg Arg Val Phe Ile Met Asp Ser Cys Asp Glu
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 Leu Ile Pro Glu Tyr Leu Asn Phe Ile Arg Gly Val Val Asp Ser Glu
 370 375 380
 Asp Leu Pro Leu Asn Ile Ser Arg Glu Met Leu Gln Gln Ser Lys Ile
 385 390 395 400
 Leu Lys Val Ile Arg Lys Asn Ile Val Lys Lys Cys Leu Glu Leu Phe
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 Ser Glu Leu Ala Glu Asp Lys Glu Asn Tyr Lys Lys Phe Tyr Glu Ala
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 Phe Ser Lys Asn Leu Lys Leu Gly Ile His Glu Asp Ser Thr Asn Arg
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 Arg Arg Leu Ser Glu Leu Leu Arg Tyr His Thr Ser Gln Ser Gly Asp
 450 455 460
 Glu Met Thr Ser Leu Ser Glu Tyr Val Ser Arg Met Lys Glu Thr Gln
 465 470 475 480
 Lys Ser Ile Tyr Tyr Ile Thr Gly Glu Ser Lys Glu Gln Val Ala Asn
 485 490 495
 Ser Ala Phe Val Glu Arg Val Arg Lys Arg Gly Phe Glu Val Val Tyr
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 Met Thr Glu Pro Ile Asp Glu Tyr Cys Val Gln Gln Leu Lys Glu Phe
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 Asp Gly Lys Ser Leu Val Ser Val Thr Lys Glu Gly Leu Glu Leu Pro
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 Glu Asp Glu Glu Glu Lys Lys Lys Met Glu Glu Ser Lys Ala Lys Phe
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 Glu Asn Leu Cys Lys Leu Met Lys Glu Ile Leu Asp Lys Lys Val Glu
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 Lys Val Thr Ile Ser Asn Arg Leu Val Ser Ser Pro Cys Cys Ile Val
 580 585 590
 Thr Ser Thr Tyr Gly Trp Thr Ala Asn Met Glu Arg Ile Met Lys Ala
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 Gln Ala Leu Arg Asp Asn Ser Thr Met Gly Tyr Met Met Ala Lys Lys
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His Leu Glu Ile Asn Pro Asp His Pro Ile Val Glu Thr Leu Arg Gln
625 630 635 640
Lys Ala Glu Ala Asp Lys Asn Asp Lys Ala Val Lys Asp Leu Val Val
645 650 655
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660 665 670
Pro Gln Thr His Ser Asn Arg Ile Tyr Arg Met Ile Lys Leu Gly Leu
675 680 685
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<213> Homo sapiens

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35 40 45
Ile Ser Asn Ser Ser Asp Ala Leu Asp Lys Ile Arg Tyr Glu Ser Leu
50 55 60
Thr Asp Pro Ser Lys Leu Asp Ser Gly Lys Glu Leu His Ile Asn Leu
65 70 75 80
Ile Pro Asn Lys Gln Asp Arg Thr Leu Thr Ile Val Asp Thr Gly Ile
85 90 95
Gly Met Thr Lys Ala Asp Leu Ile Asn Asn Leu Gly Thr Ile Ala Lys
100 105 110
Ser Gly Thr Lys Ala Phe Met Glu Ala Leu Gln Ala Gly Ala Asp Ile
115 120 125
Ser Met Ile Gly Gln Phe Gly Val Gly Phe Tyr Ser Ala Tyr Leu Val
130 135 140
Ala Glu Lys Val Thr Val Ile Thr Lys His Asn Asp Asp Glu Gln Tyr
145 150 155 160

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Ala	Trp	Glu	Ser	Ser	Ala	Gly	Gly	Ser	Phe	Thr	Val	Arg	Thr	Asp	Thr		
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Gly	Glu	Pro	Met	Gly	Arg	Gly	Thr	Lys	Val	Ile	Leu	His	Leu	Lys	Glu		
			180					185					190				
Asp	Gln	Thr	Glu	Tyr	Leu	Glu	Glu	Arg	Arg	Ile	Lys	Glu	Ile	Val	Lys		
		195					200					205					
Lys	His	Ser	Gln	Phe	Ile	Gly	Tyr	Pro	Ile	Thr	Leu	Phe	Val	Glu	Lys		
	210					215					220						
Glu	Arg	Asp	Lys	Glu	Val	Ser	Asp	Asp	Glu	Ala	Glu	Glu	Lys	Glu	Asp		
225					230					235					240		
Lys	Glu	Glu	Glu	Lys	Glu	Lys	Glu	Glu	Lys	Glu	Ser	Glu	Asp	Lys	Pro		
				245					250					255			
Glu	Ile	Glu	Asp	Val	Gly	Ser	Asp	Glu	Glu	Glu	Glu	Lys	Lys	Asp	Gly		
			260					265						270			
Asp	Lys	Lys	Lys	Lys	Lys	Lys	Ile	Lys	Glu	Lys	Tyr	Ile	Asp	Gln	Glu		
		275					280					285					
Glu	Leu	Asn	Lys	Thr	Lys	Pro	Ile	Trp	Thr	Arg	Asn	Pro	Asp	Asp	Ile		
	290					295					300						
Thr	Asn	Glu	Glu	Tyr	Gly	Glu	Phe	Tyr	Lys	Ser	Leu	Thr	Asn	Asp	Trp		
305					310					315					320		
Glu	Asp	His	Leu	Ala	Val	Lys	His	Phe	Ser	Val	Glu	Gly	Gln	Leu	Glu		
				325					330					335			
Phe	Arg	Ala	Leu	Leu	Phe	Val	Pro	Arg	Arg	Ala	Pro	Phe	Asp	Leu	Phe		
			340					345					350				
Glu	Asn	Arg	Lys	Lys	Lys	Asn	Asn	Ile	Lys	Leu	Tyr	Val	Arg	Arg	Val		
		355				360						365					
Phe	Ile	Met	Asp	Asn	Cys	Glu	Glu	Leu	Ile	Pro	Glu	Tyr	Leu	Asn	Phe		
	370					375					380						
Ile	Arg	Gly	Val	Val	Asp	Ser	Glu	Asp	Leu	Pro	Leu	Asn	Ile	Ser	Arg		
385					390					395					400		
Glu	Met	Leu	Gln	Gln	Ser	Lys	Ile	Leu	Lys	Val	Ile	Arg	Lys	Asn	Leu		
				405					410					415			
Val	Lys	Lys	Cys	Leu	Glu	Leu	Phe	Thr	Glu	Leu	Ala	Glu	Asp	Lys	Glu		
			420					425					430				
Asn	Tyr	Lys	Lys	Phe	Tyr	Glu	Gln	Phe	Ser	Lys	Asn	Ile	Lys	Leu	Gly		
		435					440					445					
Ile	His	Glu	Asp	Ser	Gln	Asn	Arg	Lys	Lys	Leu	Ser	Glu	Leu	Leu	Arg		
	450					455					460						

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Tyr	Tyr	Thr	Ser	Ala	Ser	Gly	Asp	Glu	Met	Val	Ser	Leu	Lys	Asp	Tyr	465	470	475	480
Cys	Thr	Arg	Met	Lys	Glu	Asn	Gln	Lys	His	Ile	Tyr	Tyr	Ile	Thr	Gly	485	490	495	
Glu	Thr	Lys	Asp	Gln	Val	Ala	Asn	Ser	Ala	Phe	Val	Glu	Arg	Leu	Arg	500	505	510	
Lys	His	Gly	Leu	Glu	Val	Ile	Tyr	Met	Ile	Glu	Pro	Ile	Asp	Glu	Tyr	515	520	525	
Cys	Val	Gln	Gln	Leu	Lys	Glu	Phe	Glu	Gly	Lys	Thr	Leu	Val	Ser	Val	530	535	540	
Thr	Lys	Glu	Gly	Leu	Glu	Leu	Pro	Glu	Asp	Glu	Glu	Glu	Lys	Lys	Lys	545	550	555	560
Gln	Glu	Glu	Lys	Lys	Thr	Lys	Phe	Glu	Asn	Leu	Cys	Lys	Ile	Met	Lys	565	570	575	
Asp	Ile	Leu	Glu	Lys	Lys	Val	Glu	Lys	Val	Val	Val	Ser	Asn	Arg	Leu	580	585	590	
Val	Thr	Ser	Pro	Cys	Cys	Ile	Val	Thr	Ser	Thr	Tyr	Gly	Trp	Thr	Ala	595	600	605	
Asn	Met	Glu	Arg	Ile	Met	Lys	Ala	Gln	Ala	Leu	Arg	Asp	Asn	Ser	Thr	610	615	620	
Met	Gly	Tyr	Met	Ala	Ala	Lys	Lys	His	Leu	Glu	Ile	Asn	Pro	Asp	His	625	630	635	640
Ser	Ile	Ile	Glu	Thr	Leu	Arg	Gln	Lys	Ala	Glu	Ala	Asp	Lys	Asn	Asp	645	650	655	
Lys	Ser	Val	Lys	Asp	Leu	Val	Ile	Leu	Leu	Tyr	Glu	Thr	Ala	Leu	Leu	660	665	670	
Ser	Ser	Gly	Phe	Ser	Leu	Glu	Asp	Pro	Gln	Thr	His	Ala	Asn	Arg	Ile	675	680	685	
Tyr	Arg	Met	Ile	Lys	Leu	Gly	Leu	Gly	Ile	Asp	Glu	Asp	Asp	Pro	Thr	690	695	700	
Ala	Asp	Asp	Thr	Ser	Ala	Ala	Val	Thr	Glu	Glu	Met	Pro	Pro	Leu	Glu	705	710	715	720
Gly	Asp	Asp	Asp	Thr	Ser	Arg	Met	Glu	Glu	Val	Asp					725	730		

<210> 4
 <211> 724
 <212> PRT
 <213> Mus sp.

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<400> 4

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Phe	Gln	Ala	Glu	Ile	Ala	Gln	Leu	Met	Ser	Leu	Ile	Ile	Asn	Thr	Phe	
		20						25					30			
Tyr	Ser	Asn	Lys	Glu	Ile	Phe	Leu	Arg	Glu	Leu	Ile	Ser	Asn	Ala	Ser	
		35					40						45			
Asp	Ala	Leu	Asp	Lys	Ile	Arg	Tyr	Glu	Ser	Leu	Thr	Asp	Pro	Ser	Lys	
	50					55					60					
Leu	Asp	Ser	Gly	Lys	Glu	Leu	Lys	Ile	Asp	Ile	Ile	Pro	Asn	Pro	Gln	
65					70					75					80	
Glu	Arg	Thr	Leu	Thr	Leu	Val	Asp	Thr	Gly	Ile	Gly	Met	Thr	Lys	Ala	
				85					90					95		
Asp	Leu	Ile	Asn	Asn	Leu	Gly	Thr	Ile	Ala	Lys	Ser	Gly	Thr	Lys	Ala	
			100					105						110		
Phe	Met	Glu	Ala	Leu	Gln	Ala	Gly	Ala	Asp	Ile	Ser	Met	Ile	Gly	Gln	
		115					120						125			
Phe	Gly	Val	Gly	Phe	Tyr	Ser	Ala	Tyr	Leu	Val	Ala	Glu	Lys	Val	Val	
	130						135				140					
Val	Ile	Thr	Lys	His	Asn	Asp	Asp	Glu	Gln	Tyr	Ala	Trp	Glu	Ser	Ser	
145					150					155					160	
Ala	Gly	Gly	Ser	Phe	Thr	Val	Arg	Ala	Asp	His	Gly	Glu	Pro	Ile	Gly	
				165					170					175		
Arg	Gly	Thr	Lys	Val	Ile	Leu	His	Leu	Lys	Glu	Asp	Gln	Thr	Glu	Tyr	
			180					185					190			
Leu	Glu	Glu	Arg	Arg	Val	Lys	Glu	Val	Val	Lys	Lys	His	Ser	Gln	Phe	
	195						200						205			
Ile	Gly	Tyr	Pro	Ile	Thr	Leu	Tyr	Leu	Glu	Lys	Glu	Arg	Glu	Lys	Glu	
	210					215					220					
Ile	Ser	Asp	Asp	Glu	Ala	Glu	Glu	Glu	Lys	Gly	Glu	Lys	Glu	Glu	Glu	
225					230					235					240	
Asp	Lys	Glu	Asp	Glu	Glu	Lys	Pro	Lys	Ile	Glu	Asp	Val	Gly	Ser	Asp	
				245					250					255		
Glu	Glu	Asp	Asp	Ser	Gly	Lys	Asp	Lys	Lys	Lys	Lys	Thr	Lys	Lys	Ile	
				260				265					270			
Lys	Glu	Lys	Tyr	Ile	Asp	Gln	Glu	Glu	Leu	Asn	Lys	Thr	Lys	Pro	Ile	
		275					280					285				
Trp	Thr	Arg	Asn	Pro	Asp	Asp	Ile	Thr	Gln	Glu	Glu	Tyr	Gly	Glu	Phe	
	290					295					300					

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Tyr	Lys	Ser	Leu	Thr	Asn	Asp	Trp	Glu	Asp	His	Leu	Ala	Val	Lys	His
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Phe	Ser	Val	Glu	Gly	Gln	Leu	Glu	Phe	Arg	Ala	Leu	Leu	Phe	Ile	Pro
			325						330					335	
Arg	Arg	Ala	Pro	Phe	Asp	Leu	Phe	Glu	Asn	Lys	Lys	Lys	Lys	Asn	Asn
			340					345						350	
Ile	Lys	Leu	Tyr	Val	Arg	Arg	Val	Phe	Ile	Met	Asp	Ser	Cys	Asp	Glu
	355						360					365			
Leu	Ile	Pro	Glu	Tyr	Leu	Asn	Phe	Ile	Arg	Gly	Val	Val	Asp	Ser	Glu
	370					375					380				
Asp	Leu	Pro	Leu	Asn	Ile	Ser	Arg	Glu	Met	Leu	Gln	Gln	Ser	Lys	Ile
385				390						395					400
Leu	Lys	Val	Ile	Arg	Lys	Asn	Ile	Val	Lys	Lys	Cys	Leu	Glu	Leu	Phe
			405						410						415
Ser	Glu	Leu	Ala	Glu	Asp	Lys	Glu	Asn	Tyr	Lys	Lys	Phe	Tyr	Glu	Ala
			420					425					430		
Phe	Ser	Lys	Asn	Leu	Lys	Leu	Gly	Ile	His	Glu	Asp	Ser	Thr	Asn	Arg
	435						440					445			
Arg	Arg	Leu	Ser	Glu	Leu	Leu	Arg	Tyr	His	Thr	Ser	Gln	Ser	Gly	Asp
	450					455					460				
Glu	Met	Thr	Ser	Leu	Ser	Glu	Tyr	Val	Ser	Arg	Met	Lys	Glu	Thr	Gln
465					470					475					480
Lys	Ser	Ile	Tyr	Tyr	Ile	Thr	Gly	Glu	Ser	Lys	Glu	Gln	Val	Ala	Asn
			485						490					495	
Ser	Ala	Phe	Val	Glu	Arg	Val	Arg	Lys	Arg	Gly	Phe	Glu	Val	Val	Tyr
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Met	Thr	Glu	Pro	Ile	Asp	Glu	Tyr	Cys	Val	Gln	Gln	Leu	Lys	Glu	Phe
	515						520					525			
Asp	Gly	Lys	Ser	Leu	Val	Ser	Val	Thr	Lys	Glu	Gly	Leu	Glu	Leu	Pro
	530					535					540				
Glu	Asp	Glu	Glu	Glu	Lys	Lys	Met	Glu	Glu	Ser	Lys	Ala	Lys	Phe	
545					550				555					560	
Glu	Asn	Leu	Cys	Lys	Leu	Met	Lys	Glu	Ile	Leu	Asp	Lys	Lys	Val	Glu
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Lys	Val	Thr	Ile	Ser	Asn	Arg	Leu	Val	Ser	Ser	Pro	Cys	Cys	Ile	Val
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Thr	Ser	Thr	Tyr	Gly	Trp	Thr	Ala	Asn	Met	Glu	Arg	Ile	Met	Lys	Ala
	595						600					605			

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Gln Ala Leu Arg Asp Asn Ser Thr Met Gly Tyr Met Met Ala Lys Lys
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His Leu Glu Ile Asn Pro Asp His Pro Ile Val Glu Thr Leu Arg Gln
625 630 635 640
Lys Ala Glu Ala Asp Lys Asn Asp Lys Ala Val Lys Asp Leu Val Val
645 650 655
Leu Leu Phe Glu Thr Ala Leu Leu Ser Ser Gly Phe Ser Leu Glu Asp
660 665 670
Pro Gln Thr His Ser Asn Arg Ile Tyr Arg Met Ile Lys Leu Gly Leu
675 680 685
Gly Ile Asp Glu Asp Glu Val Thr Ala Glu Glu Pro Ser Ala Ala Val
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Asp Ala Leu Asp Lys Ile Arg Tyr Glu Ser Leu Thr Asp Pro Ser Lys
50 55 60
Leu Asp Ser Gly Lys Glu Leu Lys Ile Asp Ile Ile Pro Asn Pro Gln
65 70 75 80
Glu Arg Thr Leu Thr Leu Val Asp Thr Gly Ile Gly Met Thr Lys Ala
85 90 95
Asp Leu Ile Asn Asn Leu Gly Thr Ile Ala Lys Ser Gly Thr Lys Ala
100 105 110
Phe Met Glu Ala Leu Gln Ala Gly Ala Asp Ile Ser Met Ile Gly Gln
115 120 125
Phe Gly Val Gly Phe Tyr Ser Ala Tyr Leu Val Ala Glu Lys Val Val
130 135 140

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Val	Ile	Thr	Lys	His	Asn	Asp	Asp	Glu	Gln	Tyr	Ala	Trp	Glu	Ser	Ser	145	150	155	160
Ala	Gly	Gly	Ser	Phe	Thr	Val	Arg	Ala	Asp	His	Gly	Glu	Pro	Ile	Gly	165	170	175	
Arg	Gly	Thr	Lys	Val	Ile	Leu	His	Leu	Lys	Glu	Asp	Gln	Thr	Glu	Tyr	180	185	190	
Leu	Glu	Glu	Arg	Arg	Val	Lys	Glu	Val	Val	Lys	Lys	His	Ser	Gln	Phe	195	200	205	
Ile	Gly	Tyr	Pro	Ile	Thr	Leu	Tyr	Leu	Glu	Lys	Glu	Arg	Glu	Lys	Glu	210	215	220	
Ile	Ser	Asp	Asp	Glu	Ala	Glu	Glu	Glu	Lys	Gly	Glu	Lys	Glu	Glu	Glu	225	230	235	240
Asp	Lys	Asp	Asp	Glu	Glu	Lys	Pro	Lys	Ile	Glu	Asp	Val	Gly	Ser	Asp	245	250	255	
Glu	Glu	Asp	Asp	Ser	Gly	Lys	Asp	Lys	Lys	Lys	Lys	Thr	Lys	Lys	Ile	260	265	270	
Lys	Glu	Lys	Tyr	Ile	Asp	Gln	Glu	Glu	Leu	Asn	Lys	Thr	Lys	Pro	Ile	275	280	285	
Trp	Thr	Arg	Asn	Pro	Asp	Asp	Ile	Thr	Gln	Glu	Glu	Tyr	Gly	Glu	Phe	290	295	300	
Tyr	Lys	Ser	Leu	Thr	Asn	Asp	Trp	Glu	Asp	His	Leu	Ala	Val	Lys	His	305	310	315	320
Phe	Ser	Val	Glu	Gly	Gln	Leu	Glu	Phe	Arg	Ala	Leu	Leu	Phe	Ile	Pro	325	330	335	
Arg	Arg	Ala	Pro	Phe	Asp	Leu	Phe	Glu	Asn	Lys	Lys	Lys	Lys	Asn	Asn	340	345	350	
Ile	Lys	Leu	Tyr	Val	Arg	Arg	Val	Phe	Ile	Met	Asp	Ser	Cys	Asp	Glu	355	360	365	
Leu	Ile	Pro	Glu	Tyr	Leu	Asn	Phe	Ile	Arg	Gly	Val	Val	Asp	Ser	Glu	370	375	380	
Asp	Leu	Pro	Leu	Asn	Ile	Ser	Arg	Glu	Met	Leu	Gln	Gln	Ser	Lys	Ile	385	390	395	400
Leu	Lys	Val	Ile	Arg	Lys	Asn	Ile	Val	Lys	Lys	Cys	Leu	Glu	Leu	Phe	405	410	415	
Ser	Glu	Leu	Ala	Glu	Asp	Lys	Glu	Asn	Tyr	Lys	Lys	Phe	Tyr	Glu	Ala	420	425	430	
Phe	Ser	Lys	Asn	Leu	Lys	Leu	Gly	Ile	His	Glu	Asp	Ser	Thr	Asn	Arg	435	440	445	



Met 1	Pro	Glu	Glu	Thr 5	Gln	Thr	Gln	Asp	Gln	Pro	Met	Glu	Glu	Glu	Glu 15
Val	Glu	Thr	Phe 20	Ala	Phe	Gln	Ala	Glu 25	Ile	Ala	Gln	Leu	Met 30	Ser	Leu
Ile	Ile	Asn 35	Thr	Phe	Tyr	Ser	Asn 40	Lys	Glu	Ile	Phe	Leu 45	Arg	Glu	Leu
Ile	Ser 50	Asn	Ser	Ser	Asp	Ala 55	Leu	Asp	Lys	Ile	Arg 60	Tyr	Glu	Ser	Leu
Thr 65	Asp	Pro	Ser	Lys	Leu 70	Asp	Ser	Gly	Lys	Glu 75	Leu	His	Ile	Asn	Leu 80
Ile	Pro	Ser	Lys 85	Gln	Asp	Arg	Thr	Leu	Thr 90	Ile	Val	Asp	Thr	Gly 95	Ile
Gly	Met	Thr	Lys 100	Ala	Asp	Leu	Ile	Asn 105	Asn	Leu	Gly	Thr	Ile 110	Ala	Lys
Ser	Gly	Thr 115	Lys	Ala	Phe	Met	Glu 120	Ala	Leu	Gln	Ala	Gly 125	Ala	Asp	Ile
Ser	Met 130	Ile	Gly	Gln	Phe	Gly 135	Val	Gly	Phe	Tyr	Ser 140	Ala	Tyr	Leu	Val
Ala 145	Glu	Lys	Val	Thr	Val 150	Ile	Thr	Lys	His 155	Asn	Asp	Asp	Glu	Gln	Tyr 160
Ala	Trp	Glu	Ser 165	Ala	Gly	Gly	Ser	Phe 170	Thr	Val	Arg	Thr	Asp 175	Thr	
Gly	Glu	Pro	Met 180	Gly	Arg	Gly	Thr	Lys 185	Val	Ile	Leu	His 190	Leu	Lys	Glu
Asp	Gln	Thr 195	Glu	Tyr	Leu	Glu	Glu 200	Arg	Arg	Ile	Lys 205	Glu	Ile	Val	Lys
Lys	His 210	Ser	Gln	Phe	Ile	Gly 215	Tyr	Pro	Ile	Thr 220	Leu	Phe	Val	Glu	Lys
Glu 225	Arg	Asp	Lys	Glu	Val 230	Ser	Asp	Asp	Glu	Ala 235	Glu	Glu	Lys	Glu	Glu 240
Lys	Glu	Glu	Glu	Lys 245	Glu	Lys	Glu	Glu	Lys 250	Glu	Ser	Asp	Asp	Lys 255	Pro
Glu	Ile	Glu	Asp 260	Val	Gly	Ser	Asp	Glu 265	Glu	Glu	Glu	Glu	Lys 270	Lys	Asp

Gly Asp Lys Lys Lys Lys Lys Lys Ile Lys Glu Lys Tyr Ile Asp Gln
 275 280 285
 Glu Glu Leu Asn Lys Thr Lys Pro Ile Trp Thr Arg Asn Pro Asp Asp
 290 295 300
 Ile Thr Asn Glu Glu Tyr Gly Glu Phe Tyr Lys Ser Leu Thr Asn Asp
 305 310 315 320
 Trp Glu Glu His Leu Ala Val Lys His Phe Ser Val Glu Gly Gln Leu
 325 330 335
 Glu Phe Arg Ala Leu Leu Phe Val Pro Arg Arg Ala Pro Phe Asp Leu
 340 345 350
 Phe Glu Asn Arg Lys Lys Lys Asn Asn Ile Lys Leu Tyr Val Arg Arg
 355 360 365
 Val Phe Ile Met Asp Asn Cys Glu Glu Leu Ile Pro Glu Tyr Leu Asn
 370 375 380
 Phe Ile Arg Gly Val Val Asp Ser Glu Asp Leu Pro Leu Asn Ile Ser
 385 390 395 400
 Arg Glu Met Leu Gln Gln Ser Lys Ile Leu Lys Val Ile Arg Lys Asn
 405 410 415
 Leu Val Lys Lys Cys Leu Glu Leu Phe Thr Glu Leu Ala Glu Asp Lys
 420 425 430
 Glu Asn Tyr Lys Lys Phe Tyr Glu Gln Phe Ser Lys Asn Ile Lys Leu
 435 440 445
 Gly Ile His Glu Asp Ser Gln Asn Arg Lys Lys Leu Ser Glu Leu Leu
 450 455 460
 Arg Tyr Tyr Thr Ser Ala Ser Gly Asp Glu Met Val Ser Leu Lys Asp
 465 470 475 480
 Tyr Cys Thr Arg Met Lys Glu Asn Gln Lys His Ile Tyr Phe Ile Thr
 485 490 495
 Gly Glu Thr Lys Asp Gln Val Ala Asn Ser Ala Phe Val Glu Arg Leu
 500 505 510
 Arg Lys His Gly Leu Glu Val Ile Tyr Met Ile Glu Pro Ile Asp Glu
 515 520 525
 Tyr Cys Val Gln Gln Leu Lys Glu Phe Glu Gly Lys Thr Leu Val Ser
 530 535 540
 Val Thr Lys Glu Gly Leu Glu Leu Pro Glu Asp Glu Glu Glu Lys Lys
 545 550 555 560
 Lys Gln Glu Glu Lys Lys Thr Lys Phe Glu Asn Leu Cys Lys Ile Met
 565 570 575

16/65

Lys Asp Ile Leu Glu Lys Lys Val Glu Lys Val Val Val Ser Asn Arg
580 585 590

Leu Val Thr Ser Pro Cys Cys Ile Val Thr Ser Thr Tyr Gly Trp Thr
595 600 605

Ala Asn Met Glu Arg Ile Met Lys Ala Gln Ala Leu Arg Asp Asn Ser
610 615 620

Thr Met Gly Tyr Met Ala Ala Lys Lys His Leu Glu Ile Asn Pro Asp
625 630 635 640

His Ser Ile Ile Glu Thr Leu Arg Gln Lys Ala Glu Ala Asp Lys Asn
645 650 655

Asp Lys Ser Val Lys Asp Leu Val Ile Leu Leu Tyr Glu Thr Ala Leu
660 665 670

Leu Ser Ser Gly Phe Ser Leu Glu Asp Pro Gln Thr His Ala Asn Arg
675 680 685

Ile Tyr Arg Met Ile Lys Leu Gly Leu Gly Ile Asp Glu Asp Asp Pro
690 695 700

Thr Val Asp Asp Thr Ser Ala Ala Val Thr Glu Glu Met Pro Pro Leu
705 710 715 720

Glu Gly Asp Asp Asp Thr Ser Arg Met Glu Glu Val Asp
725 730

<210> 7
<211> 573
<212> PRT
<213> Homo sapiens

<400> 7
Met Leu Arg Leu Pro Thr Val Phe Arg Gln Met Arg Pro Val Ser Arg
1 5 10 15

Val Leu Ala Pro His Leu Thr Arg Ala Tyr Ala Lys Asp Val Lys Phe
20 25 30

Gly Ala Asp Ala Arg Ala Leu Met Leu Gln Gly Val Asp Leu Leu Ala
35 40 45

Asp Ala Val Ala Val Thr Met Gly Pro Lys Gly Arg Thr Val Ile Ile
50 55 60

Glu Gln Ser Trp Gly Ser Pro Lys Val Thr Lys Asp Gly Val Thr Val
65 70 75 80

Ala Lys Ser Ile Asp Leu Lys Asp Lys Tyr Lys Asn Ile Gly Ala Lys
85 90 95

Leu Val Gln Asp Val Ala Asn Asn Thr Asn Glu Glu Ala Gly Asp Gly
100 105 110

17/65

Thr	Thr	Thr	Ala	Thr	Val	Leu	Ala	Arg	Ser	Ile	Ala	Lys	Glu	Gly	Phe	115	120	125
Glu	Lys	Ile	Ser	Lys	Gly	Ala	Asn	Pro	Val	Glu	Ile	Arg	Arg	Gly	Val	130	135	140
Met	Leu	Ala	Val	Asp	Ala	Val	Ile	Ala	Glu	Leu	Lys	Lys	Gln	Ser	Lys	145	150	155
Pro	Val	Thr	Thr	Pro	Glu	Glu	Ile	Ala	Gln	Val	Ala	Thr	Ile	Ser	Ala	165	170	175
Asn	Gly	Asp	Lys	Glu	Ile	Gly	Asn	Ile	Ile	Ser	Asp	Ala	Met	Lys	Lys	180	185	190
Val	Gly	Arg	Lys	Gly	Val	Ile	Thr	Val	Lys	Asp	Gly	Lys	Thr	Leu	Asn	195	200	205
Asp	Glu	Leu	Glu	Ile	Ile	Glu	Gly	Met	Lys	Phe	Asp	Arg	Gly	Tyr	Ile	210	215	220
Ser	Pro	Tyr	Phe	Ile	Asn	Thr	Ser	Lys	Gly	Gln	Lys	Cys	Glu	Phe	Gln	225	230	235
Asp	Ala	Tyr	Val	Leu	Leu	Ser	Glu	Lys	Lys	Ile	Ser	Ser	Ile	Gln	Ser	245	250	255
Ile	Val	Pro	Ala	Leu	Glu	Ile	Ala	Asn	Ala	His	Arg	Lys	Pro	Leu	Val	260	265	270
Ile	Ile	Ala	Glu	Asp	Val	Asp	Gly	Glu	Ala	Leu	Ser	Thr	Leu	Val	Leu	275	280	285
Asn	Arg	Leu	Lys	Val	Gly	Leu	Gln	Val	Val	Ala	Val	Lys	Ala	Pro	Gly	290	295	300
Phe	Gly	Asp	Asn	Arg	Lys	Asn	Gln	Leu	Lys	Asp	Met	Ala	Ile	Ala	Thr	305	310	315
Gly	Gly	Ala	Val	Phe	Gly	Glu	Glu	Gly	Leu	Thr	Leu	Asn	Leu	Glu	Asp	325	330	335
Val	Gln	Pro	His	Asp	Leu	Gly	Lys	Val	Gly	Glu	Val	Ile	Val	Thr	Lys	340	345	350
Asp	Asp	Ala	Met	Leu	Leu	Lys	Gly	Lys	Gly	Asp	Lys	Ala	Gln	Ile	Glu	355	360	365
Lys	Arg	Ile	Gln	Glu	Ile	Ile	Glu	Gln	Leu	Asp	Val	Thr	Thr	Ser	Glu	370	375	380
Tyr	Glu	Lys	Glu	Lys	Leu	Asn	Glu	Arg	Leu	Ala	Lys	Leu	Ser	Asp	Gly	385	390	395
Val	Ala	Val	Leu	Lys	Val	Gly	Gly	Thr	Ser	Asp	Val	Glu	Val	Asn	Glu	405	410	415

18/65

Lys Lys Asp Arg Val Thr Asp Ala Leu Asn Ala Thr Arg Ala Ala Val
420 425 430
Glu Glu Gly Ile Val Leu Gly Gly Gly Cys Ala Leu Leu Arg Cys Ile
435 440 445
Pro Ala Leu Asp Ser Leu Thr Pro Ala Asn Glu Asp Gln Lys Ile Gly
450 455 460
Ile Glu Ile Ile Lys Arg Thr Leu Lys Ile Pro Ala Met Thr Ile Ala
465 470 475 480
Lys Asn Ala Gly Val Glu Gly Ser Leu Ile Val Glu Lys Ile Met Gln
485 490 495
Ser Ser Ser Glu Val Gly Tyr Asp Ala Met Ala Gly Asp Phe Val Asn
500 505 510
Met Val Glu Lys Gly Ile Ile Asp Pro Thr Lys Val Val Arg Thr Ala
515 520 525
Leu Leu Asp Ala Ala Gly Val Ala Ser Leu Leu Thr Thr Ala Glu Val
530 535 540
Val Val Thr Glu Ile Pro Lys Glu Glu Lys Asp Pro Gly Met Gly Ala
545 550 555 560
Met Gly Gly Met Gly Gly Gly Met Gly Gly Gly Met Phe
565 570

<210> 8
<211> 627
<212> PRT
<213> Homo sapiens

<400> 8
Met Ala Arg Gly Ser Val Ser Asp Glu Glu Met Met Glu Leu Arg Glu
1 5 10 15
Ala Phe Ala Lys Val Asp Thr Asp Gly Asn Gly Tyr Ile Ser Phe Asn
20 25 30
Glu Leu Asn Asp Leu Phe Lys Ala Ala Cys Leu Pro Leu Pro Gly Tyr
35 40 45
Arg Val Arg Glu Ile Thr Glu Asn Leu Met Ala Thr Gly Asp Leu Asp
50 55 60
Gln Asp Gly Arg Ile Ser Phe Asp Glu Phe Ile Lys Ile Phe His Gly
65 70 75 80
Leu Lys Ser Thr Asp Val Ala Lys Thr Phe Arg Lys Ala Ile Asn Lys
85 90 95
Lys Glu Gly Ile Cys Ala Ile Gly Gly Thr Ser Glu Gln Ser Ser Val
100 105 110

19/65

Gly Thr	Gln His Ser Tyr Ser	Glu Glu Glu Lys Tyr	Ala Phe Val Asn
	115	120	125
Trp Ile	Asn Lys Ala Leu Glu	Asn Asp Pro Asp Cys Arg His Val Ile	
	130	135	140
Pro Met	Asn Pro Asn Thr Asn	Asp Leu Phe Asn Ala Val Gly Asp Gly	
145		150	155 160
Ile Val	Leu Cys Lys Met Ile	Asn Leu Ser Val Pro Asp Thr Ile Asp	
	165	170	175
Glu Arg	Thr Ile Asn Lys Lys Lys	Leu Thr Pro Phe Thr Ile Gln Glu	
	180	185	190
Asn Leu	Asn Leu Ala Leu Asn	Ser Ala Ser Ala Ile Gly Cys His Val	
	195	200	205
Val Asn	Ile Gly Ala Glu Asp	Leu Lys Glu Gly Lys Pro Tyr Leu Val	
	210	215	220
Leu Gly	Leu Leu Trp Gln Val	Ile Lys Ile Gly Leu Phe Ala Asp Ile	
225		230	235 240
Glu Leu	Ser Arg Asn Glu Ala Leu	Ile Ala Leu Leu Arg Glu Gly Glu	
	245	250	255
Ser Leu	Glu Asp Leu Met Lys Leu	Ser Pro Glu Glu Leu Leu Leu Arg	
	260	265	270
Trp Ala	Asn Tyr His Leu Glu	Asn Ala Gly Cys Asn Lys Ile Gly Asn	
	275	280	285
Phe Ser	Thr Asp Ile Lys Asp	Ser Lys Ala Tyr Tyr His Leu Leu Glu	
	290	295	300
Gln Val	Ala Pro Lys Gly Asp	Glu Glu Gly Val Pro Ala Val Val Ile	
305		310	315 320
Asp Met	Ser Gly Leu Arg Glu	Lys Asp Asp Ile Gln Arg Ala Glu Cys	
	325	330	335
Met Leu	Gln Gln Ala Glu Arg	Leu Gly Cys Arg Gln Phe Val Thr Ala	
	340	345	350
Thr Asp	Val Val Arg Gly Asn	Pro Lys Leu Asn Leu Ala Phe Ile Ala	
	355	360	365
Asn Leu	Phe Asn Arg Tyr Pro	Ala Leu His Lys Pro Glu Asn Gln Asp	
	370	375	380
Ile Asp	Trp Gly Ala Leu Glu	Gly Glu Thr Arg Glu Glu Arg Thr Phe	
385		390	395 400
Arg Asn	Trp Met Asn Ser Leu	Gly Val Asn Pro Arg Val Asn His Leu	
	405	410	415

20/65

Tyr Ser Asp Leu Ser Asp Ala Leu Val Ile Phe Gln Leu Tyr Glu Lys
 420 425 430
 Ile Lys Val Pro Val Asp Trp Asn Arg Val Asn Lys Pro Pro Tyr Pro
 435 440 445
 Lys Leu Gly Gly Asn Met Lys Lys Leu Glu Asn Cys Asn Tyr Ala Val
 450 455 460
 Glu Leu Gly Lys Asn Gln Ala Lys Phe Ser Leu Val Gly Ile Gly Gly
 465 470 475 480
 Gln Asp Leu Asn Glu Gly Asn Arg Thr Leu Thr Leu Ala Leu Ile Trp
 485 490 495
 Gln Leu Met Arg Arg Tyr Thr Leu Asn Ile Leu Glu Glu Ile Gly Gly
 500 505 510
 Gly Gln Lys Val Asn Asp Asp Ile Ile Val Asn Trp Val Asn Glu Thr
 515 520 525
 Leu Arg Glu Ala Glu Lys Ser Ser Ser Ile Ser Ser Phe Lys Asp Pro
 530 535 540
 Lys Ile Ser Thr Ser Leu Pro Val Leu Asp Leu Ile Asp Ala Ile Gln
 545 550 555 560
 Pro Gly Ser Ile Asn Tyr Asp Leu Leu Lys Thr Glu Asn Leu Asn Asp
 565 570 575
 Asp Glu Lys Leu Asn Asn Ala Lys Tyr Ala Ile Ser Met Ala Arg Lys
 580 585 590
 Ile Gly Ala Arg Val Tyr Ala Leu Pro Glu Asp Leu Val Glu Val Asn
 595 600 605
 Pro Lys Met Val Met Thr Val Phe Ala Cys Leu Met Gly Lys Gly Met
 610 615 620
 Lys Arg Val
 625

<210> 9

<211> 8

<212> PRT

<213> Equus caballus

<220>

<221> MOD_RES

<222> (1)

<223> May or may not be present

<220>

<221> MOD_RES

<222> (8)

<223> May or may not be present

<400> 9
Lys Val Thr Ile Ser Asn Arg Leu
1 5

<210> 10
<211> 9
<212> PRT
<213> Equus caballus

<220>
<221> MOD_RES
<222> (1)
<223> May or may not be present

<220>
<221> MOD_RES
<222> (9)
<223> May or may not be present

<400> 10
Arg Ala Leu Leu Phe Ile Pro Arg Arg
1 5

<210> 11
<211> 9
<212> PRT
<213> Equus caballus

<220>
<221> MOD_RES
<222> (1)
<223> May or may not be present

<220>
<221> MOD_RES
<222> (9)
<223> May or may not be present

<400> 11
Lys Phe Tyr Glu Ala Phe Ser Lys Asn
1 5

<210> 12
<211> 12
<212> PRT
<213> Equus caballus

<220>
<221> MOD_RES
<222> (1)
<223> May or may not be present

22/65

<220>
<221> MOD_RES
<222> (12)
<223> May or may not be present

<400> 12
Lys Ile Asp Ile Ile Pro Asn Pro Gln Glu Arg Thr
1 5 10

<210> 13
<211> 13
<212> PRT
<213> Equus caballus

<220>
<221> MOD_RES
<222> (1)
<223> May or may not be present

<220>
<221> MOD_RES
<222> (13)
<223> May or may not be present

<400> 13
Lys His Phe Ser Val Glu Gly Gln Leu Glu Phe Arg Ala
1 5 10

<210> 14
<211> 16
<212> PRT
<213> Equus caballus

<220>
<221> MOD_RES
<222> (1)
<223> May or may not be present

<220>
<221> MOD_RES
<222> (16)
<223> May or may not be present

<400> 14
Arg Gly Val Val Asp Ser Glu Asp Leu Pro Leu Asn Ile Ser Arg Glu
1 5 10 15

<210> 15
<211> 21
<212> PRT
<213> Equus caballus

<220>
 <221> MOD_RES
 <222> (1)
 <223> May or may not be present

<220>
 <221> MOD_RES
 <222> (21)
 <223> May or may not be present

<400> 15
 Arg Tyr His Thr Ser Gln Ser Gly Asp Glu Met Thr Ser Leu Ser Glu
 1 5 10 15

Tyr Val Ser Arg Met
 20

<210> 16
 <211> 23
 <212> PRT
 <213> Equus caballus

<220>
 <221> MOD_RES
 <222> (1)
 <223> May or may not be present

<220>
 <221> MOD_RES
 <222> (23)
 <223> May or may not be present

<400> 16
 Lys Ser Ile Tyr Tyr Ile Thr Gly Glu Ser Lys Glu Gln Val Ala Asn
 1 5 10 15

Ser Ala Phe Val Glu Arg Val
 20

<210> 17
 <211> 8
 <212> PRT
 <213> Homo sapiens

<220>
 <221> MOD_RES
 <222> (1)
 <223> May or may not be present

<220>
 <221> MOD_RES
 <222> (8)
 <223> May or may not be present

<400> 17
Lys Val Thr Ile Ser Asn Arg Leu
1 5

<210> 18
<211> 9
<212> PRT
<213> Homo sapiens

<220>
<221> MOD_RES
<222> (1)
<223> May or may not be present

<220>
<221> MOD_RES
<222> (9)
<223> May or may not be present

<400> 18
Arg Ala Leu Leu Phe Ile Pro Arg Arg
1 5

<210> 19
<211> 9
<212> PRT
<213> Homo sapiens

<220>
<221> MOD_RES
<222> (1)
<223> May or may not be present

<220>
<221> MOD_RES
<222> (9)
<223> May or may not be present

<400> 19
Lys Phe Tyr Glu Ala Phe Ser Lys Asn
1 5

<210> 20
<211> 12
<212> PRT
<213> Homo sapiens

<220>
<221> MOD_RES
<222> (1)
<223> May or may not be present

25/65

<220>
<221> MOD_RES
<222> (12)
<223> May or may not be present

<400> 20
Lys Ile Asp Ile Ile Pro Asn Pro Gln Glu Arg Thr
1 5 10

<210> 21
<211> 13
<212> PRT
<213> Homo sapiens

<220>
<221> MOD_RES
<222> (1)
<223> May or may not be present

<220>
<221> MOD_RES
<222> (13)
<223> May or may not be present

<400> 21
Lys His Phe Ser Val Glu Gly Gln Leu Glu Phe Arg Ala
1 5 10

<210> 22
<211> 16
<212> PRT
<213> Homo sapiens

<220>
<221> MOD_RES
<222> (1)
<223> May or may not be present

<220>
<221> MOD_RES
<222> (16)
<223> May or may not be present

<400> 22
Arg Gly Val Val Asp Ser Glu Asp Leu Pro Leu Asn Ile Ser Arg Glu
1 5 10 15

<210> 23
<211> 21
<212> PRT
<213> Homo sapiens

<220>
 <221> MOD_RES
 <222> (1)
 <223> May or may not be present

<220>
 <221> MOD_RES
 <222> (21)
 <223> May or may not be present

<400> 23
 Arg Tyr His Thr Ser Gln Ser Gly Asp Glu Met Thr Ser Leu Ser Glu
 1 5 10 15
 Tyr Val Ser Arg Met
 20

<210> 24
 <211> 23
 <212> PRT
 <213> Homo sapiens

<220>
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 <222> (1)
 <223> May or may not be present

<220>
 <221> MOD_RES
 <222> (23)
 <223> May or may not be present

<400> 24
 Lys Ser Ile Tyr Tyr Ile Thr Gly Glu Ser Lys Glu Gln Val Ala Asn
 1 5 10 15
 Ser Ala Phe Val Glu Arg Val
 20

<210> 25
 <211> 8
 <212> PRT
 <213> Homo sapiens

<220>
 <221> MOD_RES
 <222> (1)
 <223> May or may not be present

<220>
 <221> MOD_RES
 <222> (8)
 <223> May or may not be present

27/65

<400> 25

Lys Val Thr Ile Ser Asn Arg Leu
1 5

<210> 26

<211> 9

<212> PRT

<213> Homo sapiens

<220>

<221> MOD_RES

<222> (1)

<223> May or may not be present

<220>

<221> MOD_RES

<222> (9)

<223> May or may not be present

<400> 26

Arg Ala Leu Leu Phe Val Pro Arg Arg
1 5

<210> 27

<211> 9

<212> PRT

<213> Homo sapiens

<220>

<221> MOD_RES

<222> (1)

<223> May or may not be present

<220>

<221> MOD_RES

<222> (9)

<223> May or may not be present

<400> 27

Lys Phe Tyr Glu Ala Phe Ser Lys Asn
1 5

<210> 28

<211> 12

<212> PRT

<213> Homo sapiens

<220>

<221> MOD_RES

<222> (1)

<223> May or may not be present

28/65

<220>
<221> MOD_RES
<222> (12)
<223> May or may not be present

<400> 28
Lys Ile Asp Ile Leu Pro Asn Pro Gln Glu Arg Thr
1 5 10

<210> 29
<211> 13
<212> PRT
<213> Homo sapiens

<220>
<221> MOD_RES
<222> (1)
<223> May or may not be present

<220>
<221> MOD_RES
<222> (13)
<223> May or may not be present

<400> 29
Lys His Glu Ser Val Glu Gly Gln Leu Glu Phe Arg Ala
1 5 10

<210> 30
<211> 16
<212> PRT
<213> Homo sapiens

<220>
<221> MOD_RES
<222> (1)
<223> May or may not be present

<220>
<221> MOD_RES
<222> (16)
<223> May or may not be present

<400> 30
Arg Gly Val Val Asp Ser Glu Asp Leu Pro Leu Asn Ile Ser Arg Glu
1 5 10 15

<210> 31
<211> 21
<212> PRT
<213> Homo sapiens

29/65

<220>
<221> MOD_RES
<222> (1)
<223> May or may not be present

<220>
<221> MOD_RES
<222> (21)
<223> May or may not be present

<400> 31
Arg Tyr His Thr Ser Gln Ser Gly Asp Glu Met Thr Ser Leu Ser Glu
1 5 10 15
Tyr Val Ser Arg Met
20

<210> 32
<211> 23
<212> PRT
<213> Homo sapiens

<220>
<221> MOD_RES
<222> (1)
<223> May or may not be present

<220>
<221> MOD_RES
<222> (23)
<223> May or may not be present

<400> 32
Lys Ser Ile Tyr Tyr Ile Thr Gly Glu Ser Lys Glu Gln Val Ala Asn
1 5 10 15
Ser Ala Phe Val Glu Arg Val
20

<210> 33
<211> 8
<212> PRT
<213> Rattus sp.

<220>
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30/65

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1 5

<210> 34
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1 5

<210> 35
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1 5

<210> 36
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31/65

<220>
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Tyr Val Ser Arg Met
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 Ser Ala Phe Val Glu Arg Val
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<210> 40
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 1 5 10

<210> 41
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<210> 43
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 1 5 10

<210> 44
 <211> 12
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<210> 47
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<210> 51
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<400> 51
Lys Ala Ile Leu Phe Val Pro Arg Arg
1 5

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 1 5 10

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<400> 54
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 1 5 10 15

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 1 5 10

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 1 5 10 15

<210> 57
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 1 5 10 15

Trp

<210> 58
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39/65

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Pro Lys Asn

<210> 59

<211> 8

<212> PRT

<213> Mus musculus

<220>

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<222> (8)

<223> May or may not be present

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<210> 60

<211> 10

<212> PRT

<213> Mus musculus

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<223> May or may not be present

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1 5 10

<210> 61

<211> 13

<212> PRT

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<222> (1)

<223> May or may not be present

<220>
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 1 5 10

<210> 62
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 1 5 10 15

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 1 5 10

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 1 5 10 15

Trp

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 1 5

<210> 67
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<400> 67
 Lys Asn Thr Val Gln Gly Phe Lys Arg Phe
 1 5 10

<210> 68
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 <212> PRT
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<400> 68
 Lys Gln Val Tyr Val Asp Lys Leu Ala Glu Leu Lys Ser
 1 5 10

<210> 69
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 <212> PRT
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<400> 69
 Lys Val Leu Ala Thr Ala Phe Asp Thr Thr Ile Gly Gly Arg Lys
 1 5 10 15

<210> 70
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 1 5 10

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<220>
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<400> 71
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Trp

<400> 73
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Lys Val Phe His Gly Leu Lys Ser
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Lys Tyr Ala Ile Ser Met Ala Arg Lys
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<400> 76
 Arg Val Asn Lys Pro Pro Val Pro Lys Leu
 1 5 10

<210> 77
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<400> 77
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<400> 78
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 1 5 10

<210> 79
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 1 5 10

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 1 5 10 15

<210> 82
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 1 5 10 15

<210> 83
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 <212> PRT
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Arg Thr

<210> 84
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<220>
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48/65

<220>
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1 5 10 15

Leu Arg Glu

<210> 85
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<212> PRT
<213> Mus musculus

<220>
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Lys Val Phe His Gly Leu Lys Ser
1 5

<210> 86
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Lys Tyr Ala Ile Ser Met Ala Arg Lys
1 5

<210> 87
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 1 5 10

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 1 5 10

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 1 5 10

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 1 5 10

<210> 91
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 1 5 10

<210> 92

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 Lys Met Ile Asn Leu Ser Val Pro Asp Thr Ile Asp Glu Arg Thr
 1 5 10 15

<210> 94
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 <212> PRT
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 1 5 10 15

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 1 5 10 15

Arg Thr

<210> 96
 <211> 19
 <212> PRT
 <213> Mus musculus

52/65

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1 5 10 15

Leu Arg Glu

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<212> PRT
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1 5

<210> 98
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1 5

<210> 99
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<400> 101
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 1 5 10

<210> 102
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<220>
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<400> 102
Arg Gln Phe Val Thr Ala Thr Asp Val Val Arg Gly
1 5 10

<210> 103
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<212> PRT
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Lys Met Ile Asn Leu Ser Val Pro Asp Thr Ile Asp Glu Arg Thr
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Leu Arg Glu

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Phe Gln Ala Glu Ile Ala Gln Leu Met Ser Leu Ile Ile Asn Thr Phe
 20 25 30

Tyr Ser Asn Lys Glu Ile Phe Leu Arg Glu Leu Ile Ser Asn Ala Ser
 35 40 45

Asp Ala Leu Asp Lys Ile Arg Tyr Glu Ser Leu Thr Asp Pro Ser Lys
 50 55 60

Leu Asp Ser Gly Lys Glu Leu Lys Ile Asp Ile Ile Pro Asn Pro Gln
 65 70 75 80

Glu Arg Thr Leu Thr Leu Val Asp Thr Gly Ile Gly Met Thr Lys Ala
 85 90 95

Asp Leu Ile Asn Asn Leu Gly Thr Ile Ala Lys Ser Gly Thr Lys Ala
 100 105 110

Phe Met Glu Ala Leu Gln Ala Gly Ala Asp Ile Ser Met Ile Gly Gln
 115 120 125

Phe Gly Val Gly Phe Tyr Ser Ala Tyr Leu Val Ala Glu Lys Val Val
 130 135 140

Val	Ile	Thr	Lys	His	Asn	Asp	Asp	Glu	Gln	Tyr	Ala	Trp	Glu	Ser	Ser		
145					150					155					160		
Ala	Gly	Gly	Ser	Phe	Thr	Val	Arg	Ala	Asp	His	Gly	Glu	Pro	Ile	Gly		
				165					170					175			
Arg	Gly	Thr	Lys	Val	Ile	Leu	His	Leu	Lys	Glu	Asp	Gln	Thr	Glu	Tyr		
			180					185					190				
Leu	Glu	Glu	Arg	Arg	Val	Lys	Glu	Val	Val	Lys	Lys	His	Ser	Gln	Phe		
		195					200					205					
Ile	Gly	Tyr	Pro	Ile	Thr	Leu	Tyr	Leu	Glu	Lys	Xaa	Xaa	Xaa	Xaa	Xaa		
	210					215					220						
Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	
225					230					235						240	
Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	
				245					250						255		
Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	
			260					265					270				
Xaa	Xaa	Xaa	Tyr	Ile	Asp	Gln	Glu	Glu	Leu	Asn	Lys	Thr	Lys	Pro	Ile		
	275						280					285					
Trp	Thr	Arg	Asn	Pro	Asp	Asp	Ile	Thr	Gln	Glu	Glu	Tyr	Gly	Glu	Phe		
	290					295					300						
Tyr	Lys	Ser	Leu	Thr	Asn	Asp	Trp	Glu	Asp	His	Leu	Ala	Val	Lys	His		
305					310					315					320		
Phe	Ser	Val	Glu	Gly	Gln	Leu	Glu	Phe	Arg	Ala	Leu	Leu	Phe	Ile	Pro		
				325					330					335			
Arg	Arg	Ala	Pro	Phe	Asp	Leu	Phe	Glu	Asn	Lys	Lys	Lys	Lys	Asn	Asn		
			340					345					350				
Ile	Lys	Leu	Tyr	Val	Arg	Arg	Val	Phe	Ile	Met	Asp	Ser	Cys	Asp	Glu		
	355						360					365					
Leu	Ile	Pro	Glu	Tyr	Leu	Asn	Phe	Ile	Arg	Gly	Val	Val	Asp	Ser	Glu		
	370					375					380						
Asp	Leu	Pro	Leu	Asn	Ile	Ser	Arg	Glu	Met	Leu	Gln	Gln	Ser	Lys	Ile		
385				390						395					400		
Leu	Lys	Val	Ile	Arg	Lys	Asn	Ile	Val	Lys	Lys	Cys	Leu	Glu	Leu	Phe		
				405					410					415			
Ser	Glu	Leu	Ala	Glu	Asp	Lys	Glu	Asn	Tyr	Lys	Lys	Phe	Tyr	Glu	Ala		
			420					425					430				
Phe	Ser	Lys	Asn	Leu	Lys	Leu	Gly	Ile	His	Glu	Asp	Ser	Thr	Asn	Arg		
	435						440					445					

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Arg	Arg	Leu	Ser	Glu	Leu	Leu	Arg	Tyr	His	Thr	Ser	Gln	Ser	Gly	Asp	450	455	460
Glu	Met	Thr	Ser	Leu	Ser	Glu	Tyr	Val	Ser	Arg	Met	Lys	Glu	Thr	Gln	465	470	475
Lys	Ser	Ile	Tyr	Tyr	Ile	Thr	Gly	Glu	Ser	Lys	Glu	Gln	Val	Ala	Asn	485	490	495
Ser	Ala	Phe	Val	Glu	Arg	Val	Arg	Lys	Arg	Gly	Phe	Glu	Val	Val	Tyr	500	505	510
Met	Thr	Glu	Pro	Ile	Asp	Glu	Tyr	Cys	Val	Gln	Gln	Leu	Lys	Glu	Phe	515	520	525
Asp	Gly	Lys	Ser	Leu	Val	Ser	Val	Thr	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	530	535	540
Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	545	550	555
Xaa	Asn	Leu	Cys	Lys	Leu	Met	Lys	Glu	Ile	Leu	Asp	Lys	Lys	Val	Glu	565	570	575
Lys	Val	Thr	Ile	Ser	Asn	Arg	Leu	Val	Ser	Ser	Pro	Cys	Cys	Ile	Val	580	585	590
Thr	Ser	Thr	Tyr	Gly	Trp	Thr	Ala	Asp	Met	Glu	Arg	Ile	Met	Lys	Ala	595	600	605
Gln	Ala	Leu	Arg	Asp	Asn	Ser	Thr	Met	Gly	Tyr	Met	Met	Ala	Lys	Lys	610	615	620
His	Leu	Glu	Ile	Asn	Pro	Asp	His	Pro	Ile	Val	Glu	Thr	Leu	Arg	Gln	625	630	635
Lys	Ala	Glu	Ala	Asp	Lys	Asn	Asp	Lys	Ala	Val	Lys	Asp	Leu	Val	Val	645	650	655
Leu	Leu	Phe	Glu	Thr	Ala	Leu	Leu	Ser	Ser	Gly	Phe	Ser	Leu	Glu	Asp	660	665	670
Pro	Gln	Thr	His	Ser	Asn	Arg	Ile	Tyr	Arg	Met	Ile	Lys	Leu	Gly	Leu	675	680	685
Gly	Ile	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	690	695	700
Xaa	Xaa	Xaa	Ile	Pro	Pro	Leu	Glu	Gly	Asp	Glu	Asp	Ala	Ser	Arg	Met	705	710	715
Glu	Glu	Val	Asp															720

u Arg Xaa Xaa Xaa Xaa
5 230

a Xaa Xaa Xaa Xaa Xaa
245

a Xaa Xaa Xaa Xaa Xaa
260

a Xaa Xaa Xaa Xaa Xaa
275

a Xaa Leu Asn Lys Thr
290

e Thr Asn Glu Glu Tyr
5 310

p Glu Glu His Leu Ala
325

u Phe Arg Ala Leu Leu
340

e Glu Asn Arg Lys Lys
355

l Phe Ile Met Asp Asn
370

e Ile Arg Gly Val Val
390

g Glu Met Leu Gln Glu
405

u Val Lys Lys Cys Leu
420

u Asn Tyr Lys Lys Phe
435

y Ile His Glu Asp Ser
450

g Tyr Tyr Thr Ser Ala
470

r Cys Thr Arg Met Lys
485

y Glu Thr Lys Asp Glu
500

g Lys His Cys Leu Glu
515

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Ile Ile Asn Thr Phe Tyr Ser Asn Lys Glu Ile Phe Leu Arg Glu Leu
35 40 45
Ile Ser Asn Ser Ser Asp Ala Leu Asp Lys Ile Arg Tyr Glu Ser Leu
50 55 60
Thr Asp Pro Ser Lys Leu Asp Ser Gly Lys Glu Leu His Ile Asn Leu
65 70 75 80
Ile Pro Ser Lys Gln Asp Arg Thr Leu Thr Ile Val Asp Thr Gly Ile
85 90 95
Gly Met Thr Lys Ala Asp Leu Ile Asn Asn Leu Gly Thr Ile Ala Lys
100 105 110
Ser Gly Thr Lys Ala Phe Met Glu Ala Leu Gln Ala Gly Ala Asp Ile
115 120 125
Ser Met Ile Gly Gln Phe Gly Val Gly Phe Tyr Ser Ala Tyr Leu Val
130 135 140
Ala Glu Lys Val Thr Val Ile Thr Lys His Asn Asp Asp Glu Gln Tyr
145 150 155 160
Ala Trp Glu Ser Ser Ala Gly Gly Ser Phe Thr Val Arg Thr Asp Thr
165 170 175
Gly Glu Pro Met Gly Arg Gly Thr Lys Val Ile Leu His Leu Lys Glu
180 185 190
Asp Gln Thr Glu Tyr Leu Glu Glu Arg Arg Ile Lys Glu Ile Val Lys
195 200 205
Lys His Ser Gln Phe Ile Gly Tyr Pro Ile Thr Leu Phe Val Glu Lys
210 215 220

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Tyr	Cys	Val	Gln	Gln	Leu	Lys	Glu	Phe	Glu	Gly	Lys	Thr	Leu	Val	Ser
530						535					540				
Val	Thr	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa
545					550					555					560
Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Asn	Leu	Cys	Lys	Ile	Met
				565						570				575	
Lys	Asp	Ile	Leu	Glu	Lys	Lys	Val	Glu	Lys	Val	Val	Val	Ser	Asn	Arg
			580					585					590		
Leu	Val	Thr	Ser	Pro	Cys	Cys	Ile	Val	Thr	Ser	Thr	Tyr	Gly	Trp	Thr
	595						600					605			
Ala	Asn	Met	Glu	Arg	Ile	Met	Lys	Ala	Gln	Ala	Leu	Arg	Asp	Asn	Ser
610						615					620				
Thr	Met	Gly	Tyr	Met	Ala	Ala	Lys	Lys	His	Leu	Glu	Ile	Asn	Pro	Asp
625					630					635					640
His	Ser	Ile	Ile	Glu	Thr	Leu	Arg	Gln	Lys	Ala	Glu	Ala	Asp	Lys	Asn
				645					650					655	
Asp	Lys	Ser	Val	Lys	Asp	Leu	Val	Ile	Leu	Leu	Tyr	Glu	Thr	Ala	Leu
			660					665					670		
Leu	Ser	Ser	Gly	Phe	Ser	Leu	Glu	Asp	Pro	Gln	Thr	His	Ala	Asn	Arg
			675				680					685			
Ile	Tyr	Arg	Met	Ile	Lys	Leu	Gly	Leu	Gly	Ile	Asp	Glu	Asp	Asp	Pro
	690					695					700				
Thr	Val	Asp	Asp	Thr	Ser	Ala	Ala	Val	Thr	Glu	Glu	Met	Pro	Pro	Leu
705					710					715					720
Glu	Gly	Asp	Asp	Asp	Thr	Ser	Arg	Met	Glu	Glu	Val	Asp			
				725					730						

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<223> Description of Unknown Organism: Hypothetical peptide

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Ala Lys Pro Val Leu Glu Asp Leu Arg

1

5